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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/737,339

12/16/2003

Yuguang Fang

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AKERMAN SENTERFITT

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WEST PALM BEACH, FL 33402-3188

EXAMINER

HAILE, AWET A

ART UNIT

PAPER NUMBER

2616

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/737,339

Applicant(s)

FANG ET AL.

Examiner

Awet A. Haile

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-14 is/are rejected.
- 7) ☒ Claim(s) 6 and 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 03/22/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## ***DETAILED ACTION***

### ***Response to Amendment***

1. The indicated allowability of claims 1-5 and 8-14 is withdrawn in view of the newly discovered reference(s) to. Rejections based on the newly cited reference(s) follow.

### ***Drawing***

2. **Figure 1 and 2** should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objection***

3. **Claims 1 –14** are objected to under 37 CFR 1.75 because of the following informalities

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**Regarding claim 1**, line 1, it is suggested to applicant to change the “ OFDM” to -- Orthogonal Frequency Division Multiplexing(OFDM)-- ”

**Regarding claim 1**, line 3, it is suggested to applicant to change the “Inverse Fast Fourier-transforming’ to --- Inverse Fast Fourier Transforming (IFFT)--- similar problem exist in claim 8 line 3, and claim 10 line 2.

Regarding claim 7, line 9, it is suggested to applicant to change the “FFT” to --- Fast Fourier Transforming (FFT)--- similar problem exist in claim 10 line 9.

**Regarding claim 1**, line 4, the occurrence of “ IFFT” seems to refer back to “Inverse Fast Fourier Transforming’ previously recited in claim 1 line 3, if this is true, it is suggested to applicant to change “ an IFFT” to --- said IFFT---. Similar problem exist in claim 7 line 3, claim 10 line 3,

**Regarding claim 8**, line 5, the occurrence of ‘inverse-Fourier –transforming” seems to be a typo error, if this is true, it is suggested to applicant to change “inverse-Fourier –transforming” to --- Inverse Fast Fourier Transforming---

**Claims 2-6, 9 and 11-14** are objected to because they depend on an objected claim appropriate correction is required.

***Claim Rejections – 35 USC§ 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. **Claims 10-14** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 10 is directed to a non-statutory subject matter because the claim recites, "calculating a signal-to-noise ratio " which is not a useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof. because there is no post-solution of the mathematical algorithm.

**Claims 11 –14** are rejected to because they depend on a rejected claim.

***Claim Rejection – 35 USC§ 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior

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art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. **Claims 1-5, 8,9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tandai et al (US 2003/0171128 A1) in view of Shattil (US 2004/0141548 A1)

**Regarding claim 1 and 8**, Tandai et al shows a method of generating a preamble in a OFDM communication system, comprises the steps of: replicating output signals from the transforming step for a predetermined number of times to provide replicated signals; and placing the replicated signals in serial (see paragraph 47, lines 4 – 10) as recited in claim 1. A method of generating a training packet for a signal-to-noise ratio calculation and bit loading, comprising the steps of: replicating output signals of the IFFT six times and placing replicated signals in serial (see paragraph 47, lines 4-10, “plurality of times” the plurality of time can be six times) as recited in claim 8.

However Tandai et al fail to teach Inverse Fast Fourier-transforming polyphase code sequences whose number is the same as half of an IFFT size using Hermitian symmetry as recited in claims 1 and 8.

Shattil from the same field of endeavor teach inverse Fast Fourier-transforming (see fig 2, IFFT 206) polyphase code sequences whose number is the same as half of an IFFT size (see paragraph 58, line 2, “ $N/2$  conjugate mirror samples”) using Hermitian symmetry (see paragraph 58, lines 7 – 12);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of IFFT polyphase codes whose sequence is half of IFFT size Using Hermitian symmetry as taught by Shattil into the transmitter of Tandai et al. The motivation for doing this is to get a real number output from the IFFT.

**Regarding claim 2**, Tandai et al teaches that the predetermined number of time is 4(see paragraph 47, line 8, “plurality of times” the plurality of time can be 4 times)

**Regarding claim 9**, Tandai et al teaches the method further comprises the step of synchronizing using the training packet (see abstract).

**Regarding claim 3-5**, Tandai et al and Shattil disclose all the subject matter with the exception of convolving a received signal with a polyphase code sequence which is same

as a transmitted polyphase code sequence; and maintaining the convolving step until four peaks are found as recited in claim 3. If the four peaks are found, the synchronization is done successfully as recited in claim 4. Synchronization is unsuccessful if the four peaks are not found as recite in claim 5.

However, convolving a received signal with a polyphase code sequence, which is same as a transmitted polyphase code sequence; and maintaining the convolving step until four peaks are found. If the four peaks are found, the synchronization is done successfully. Synchronization is unsuccessful if the four peaks are not found is a well known in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of convolving a received signal with a polypahse code sequences, maintaining the convolving step until four peaks are found and determining the successfulness of synchronization based on the four peaks into the receiver of Tandai et al. the motivation for doing this is for better synchronization.

9. **Claims 10 –12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al (US 2004/0184398 A1) in view of Shattil (US 2004/0141548 A1)

**Regarding claim 10**, a method of calculating a signal-to-noise ratio, comprising the steps of: taking samples of an IFFT size in advance from a subsequent sample of a sample of



each peak (see paragraph 200, line 3 –6 see figure 9A RXRF unit 912); generating six sample blocks (see paragraph 200, line 11-12 “ set of  $N_f$ ” implies number of blocks could be six); Fourier-transforming each block to provide Fourier-transformed signals (see paragraph 200, lines 8-12); calculating the signal-to-noise ratio for each sub-carrier with six signals from six Fourier-transformed blocks for a same sub-carrier ( see paragraph 203, 9 –10 )

However, Walton et al fail to teach that using polyphase code sequences whose number is the same as a half of an IFFT size: taking the Fourier-transformed signals from a first output to an output signal having half of an FFT size

Shattil from the same field of endeavor teach that using polyphase code sequences whose number is the same as a half of an IFFT size: taking the Fourier-transformed signals from a first output to an output signal having half of an FFT size (see paragraph 58, line 2, “ $N/2$  conjugate mirror samples”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of using half of an IFFT size into the receiver of Walton et al. The motivation for doing this is to calculate Signal to Noise Ratio accurately.

**Regarding clam 11 and 12**, Walton et al discloses the step of smoothing a signal-to-noise ratio distribution by convolving the signal-to-noise ratio distribution with 7 sample points of a normal distribution (see paragraph 72, lines 13-18). Step of bit allocating by selecting a modulation type for each sub-carrier according to the signal-to-noise ratio distribution (see paragraph 72)

10. **Claims 13 and 14**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al and Shattil as applied to claim 10 above, and further in view of Dollard (US 6934340 B1)

Regarding claim 13 and 14, Walton et al and Shattil discloses all the subject matter with the exception of, the step of generating a bitmap and storing the bitmap as recited in claim 13, the step of transmitting the bitmap as recited in claim 14.

However Dollard from the same field of endeavor teach the step of generating a bitmap and storing the bitmap (column 8, line 19), the step of transmitting the bitmap (see column 8, line 24)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate generating a bitmap and then transmit as taught by Dollard into the modified transmitter of Walton and Shattil. The motivation for doing this is for better calculation of signal -to -noise -ratio.

***Allowable Subject Matter***

11. **Claims 6 and 7** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is reason for allowance:

**Regarding claims 6 and 7**, the prior arts fail to teach alone or in combination “a threshold for deciding whether a peak is found is a number which is a magnitude of a first peak times a constant that is a number between 0.7 and 1.0. as recited in claim 6.  
“dividing each average of the output signals by a respective magnitude of the polyphase code sequence transmitted originally” as recited in claim 7.

***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Linnartz et al (US 2002/0181549 A1), Troulis (US 7218693 B2), Sandell et al (US 2004/0131011 A1), Wu et al (US 2002/0172146 A1), Xu (US 2004/0047368 A1), Yeh et al (US 2005/0259568 A1), Giannakis et al (US 2002/0181389) are recited to show OFDM communication system.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Awet Haile whose telephone number is (571) 270-3114. The examiner can normally be reached on Monday - Thursday 10:00 AM – 5:00 PM EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on (571) 272-7629. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, Call 800 –786-9199(IN USA OR CANADA) or 571-272-1000.



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